



# Coronavirus Disease 2019 (COVID-19)



## Guide to Global Digital Tools for COVID-19 Response

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The guide compares the District Health Information Software (DHIS2), the Surveillance, Outbreak Response Management and Analysis System (SORMAS), Go.Data, Open Data Kit (ODK), Epi Info, CommCare, KoboToolbox, Excel, and paper. Each has been deployed in various countries for contact tracing, investigations, and/or, in the case of DHIS2 and SORMAS, national surveillance. Paper is also included because it continues to be used and there are a number of resources available online for the COVID-19 response.

This guide is not meant to be an all encompassing guide to all available tools or features. Rather is it focused on the primary tools that are being reported to CDC and the functions that are commonly asked about. It is meant to be a dynamic resource that will be updated as additional tools are reported from the field offices and as additional questions about the functional elements arise.

## District Health Information Software (DHIS2)

DHIS2 is used as national health information system platform for integrated data management and analysis for program monitoring and evaluation in 70+ countries. It is primarily used for reporting and analysis of routine health data; but also serves as a de facto facility registry, can be deployed for service availability mapping and other periodic survey activities, and as a data warehouse to facilitate integrated analysis. Increasingly, it is also used as a 'last-mile' solution for logistics monitoring, particularly at health facility level.

**Software**

**DHIS2 and the DHIS2 COVID-19 Package**

## System Overview


DHIS2 is used as national health information system platform for integrated data management and analysis for program monitoring and evaluation in 70+ countries. It is primarily used for reporting and analysis of routine health data; but also serves as a de facto facility registry, can be deployed for service availability mapping and other periodic survey activities, and as a data warehouse to facilitate integrated analysis. Increasingly, it is also used as a 'last-mile' solution for logistics monitoring, particularly at health facility level.

DHIS2 comes with three data models 1) aggregate, 2) single events (e.g. for line-listing data) and 3) longitudinal tracking of any entity (patient or otherwise) over time. The core DHIS2 software includes a number of web apps for data capture, analysis, reports, maintenance, user management, data quality, etc. The tracker model supports use cases such as case-based surveillance and patient follow-up; and can be used in tandem with other data models. In addition, an Android app is a core component of the platform to enable out-of-the-box mobile data collection with no interoperability layers required. A DHIS2 Android Software Development Kit (SDK) enables developers to customize mobile application interfaces that integrate natively with DHIS2, supporting all three data models (aggregate, event, tracker). DHIS2 is entirely generic and configurable through a web interface, which means it can be used for any number of use cases.


A set of digital metadata packages has been developed to facilitate rapid deployment of COVID-19 data elements, indicators and dashboards by installing a metadata file into a country existing DHIS2. The digital data packages are developed in collaboration with WHO to align with global standards for data collection and analysis, inclusive of case definitions, laboratory testing protocols and recommended standard indicators. The packages provide a pre-configured template that can be further adapted to local contexts and country-specific needs. COVID-19 packages have been developed to support both aggregate and case-based surveillance, contact tracing and follow up, ports of entry screening and follow up, and analysis through pre-configured indicators and dashboards. All COVID-19 packages can be deployed out-of-the-box with the DHIS2 Android app for mobile data collection. The packages support workflows and tasks for different types of users involved in the COVID-19 response (e.g. contact tracers, laboratory users, clinicians, epidemiologists and response teams).

**COVID-19  
Specific  
Functions**

Digital packages for COVID-19 capitalize on the core functionality of DHIS2 and the DHIS2 Android Capture app to support COVID-19 surveillance and response activities. COVID-19 metadata packages are modular in nature and can be installed together or separately in a country's DHIS2 system:






- COVID-19 Case-based surveillance [tracker data model]: enrolls & tracks suspected cases; captures symptoms, demographics, risk factors & exposures; creates lab requests and captures laboratory data about the case; links confirmed cases with contacts; and monitors patient outcomes. This package can be installed as a standalone COVID-19 form or can be integrated into a country's existing integrated disease surveillance & response tracker.
- Contact registration & follow-up program [tracker data model]: strengthens active case detection through contact tracing activities, such as identification and follow-up of contacts of a suspected or confirmed COVID-19 case.
- Ports of Entry screening & follow-up program [tracker]: enrolls travelers who have visited high-risk locations at Ports of Entry for 14-day monitoring and follow-up.
- COVID-19 Surveillance Event Program [event]: a simplified line-list that captures a subset of minimum critical data points to facilitate rapid analysis & response, particularly useful when caseloads or burden of reporting exceeds capacity for case-based surveillance tracker
- COVID-19 Aggregate Surveillance [aggregate]: an aggregate reporting dataset that captures minimum necessary data points for daily or weekly reporting. Core DHIS2 functionality to support COVID-19 includes: longitudinal tracking of suspected and confirmed COVID-19 cases (through Tracker data model), line-listing (through Event data model), alerts & notifications (e.g. thresholds), working lists, DHIS2 Android App for seamless mobile data capture, automated dashboards, on-the-fly calculation of key indicators and data-push features for exporting and sharing COVID-19 data. All COVID-19 development is based on the WHO guidelines located here, <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance-publications> 

**Developer**

University of Oslo,  
<https://www.mn.uio.no/ifi/english/research/networks/hisp/> 

**Turn-key COVID-19 Applications**

Yes

<b>Link to site</b>	<a href="https://www.dhis2.org">https://www.dhis2.org</a>  <a href="https://www.dhis2.org/covid-19">https://www.dhis2.org/covid-19</a> 
<b>Type of Digital Tool</b>	Health Information System for aggregate and case-based data, contact tracing, ports of entry, analysis, mapping, dashboards, and mobile data collection
<b>Interoperability</b>	<p>DHIS2 has a robust API and supports several data formats for import and export through the API to enable interoperability with applications such as OpenLMIS, iHRIS, OpenSRP, etc. Resources for developers are documented here: <a href="https://docs.dhis2.org/2.34/en/dhis2_developer_manual/web-api.html">https://docs.dhis2.org/2.34/en/dhis2_developer_manual/web-api.html</a> </p> <p>There is a FHIR adapter to enable HL7-FHIR integration. DHIS2 also supports the ADX standard, developed and maintained by the Quality Research and Public Health committee of the IHE (Integrating the HealthCare Enterprise). <a href="https://docs.dhis2.org/master/en/developer/html/webapi_adx_data_format.html">https://docs.dhis2.org/master/en/developer/html/webapi_adx_data_format.html</a> </p>
<b>Hosting</b>	Local and cloud options
<b>Cost</b>	Free (there are no licensing costs associated with this software)
<b>Mobile</b>	Android (for smart phones) and cellular (for SMS over GSM)
<b>Mobile Clients</b>	Android: Java, HTML5, and SMS
<b>Mobile Platform</b>	<p>All digital data packages are optimized for Android data collection with the DHIS2 Capture App, which is free to download on the Google Play store: <a href="https://play.google.com/store/apps/details?id=com.dhis2&amp;hl=en">https://play.google.com/store/apps/details?id=com.dhis2&amp;hl=en</a> </p>
<b>Email</b>	Email notification
<b>SMS</b>	Integrated SMS engine will allow two-way communication between data collection on mobile devices and the server to receive messaging or send it.
<b>Database Type</b>	PostgreSQL/MySQL

## Mobile Data Collection

The DHIS2 Android Capture App is a mobile application designed to function seamlessly with your DHIS2 instance. The Android app supports data capture across all DHIS2 data models, including aggregate and individual-level data for Tracker and Event programs. And the app functions in both online and offline mode, meaning that data and metadata are automatically synchronized whenever there is internet access, which makes it an effective mobile data entry solution for locations where internet connectivity is limited. The app is developed and maintained by a DHIS2 development team, which ensures that the latest versions of the Android app are fully compatible with all supported DHIS2 core software versions. The app can be downloaded for free from Google Play or Github.

## Data Management


DHIS2 lets you manage aggregate, routine data through a flexible meta-data model. Everything can be configured through the user interface: You can set up data elements, data entry forms, validation rules, indicators and reports in order to create a fully-fledged system for data management.

<https://www.dhis2.org/data-management> 

## Development Language


Java, React

## Data Security and Privacy

[https://docs.dhis2.org/2.34/en/dhis2\\_android\\_implementation\\_guideline/data-security-and-privacy.html](https://docs.dhis2.org/2.34/en/dhis2_android_implementation_guideline/data-security-and-privacy.html) 

## Data Standards

FHIR, ADX standard, REST-based Web API, Web interface in HTML 5 standard, part of the OpenHIE Framework. The COVID-19 metadata is mapped and coded to the WHO COVID-19 data dictionary available here:

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance-publications> 

## Analysis

DHIS2 supports mapping of both aggregated and individual data, including showing relations between cases . It supports all the standard chart types like column, line, pie, stacked column and area charts, and can be extended with new modules for e.g. network charts, which has been done for COVID-19. DHIS2 features a fully web-based pivot table which lets you analyze data along all data dimensions and arrange these on columns, rows and as filters at demand. You can include totals and subtotals and remove empty rows, and control display density, font size and digit group separator. Pivot tables can be saved as favorites and be downloaded and used as basis for offline MS Excel pivot tables.

**Charts**

Charts can be saved as favorites and shared. Charts can be downloaded as images and PDFs. You can display trend lines, legends, titles, labels, target lines and baselines. Select easily from all of your indicators, organizational units, time periods and other dimensions, and flip categories and series around as you like.

**GIS**

DHIS2 features awesome web-based GIS features that lets you do thematic mapping of areas and points, view facilities based on classifications, visualize catchment areas for each facility. You can define custom legend sets and link them to indicators. The DHIS2 GIS lets you put labels on areas and points and search and filter based on various criteria. You can overlay multiple layers and use Google Maps as background layer. You can move points and set locations on-the-fly. Maps can be saved as favorites and shared with other people.

**Dashboards**

DHIS2 provides a personal dashboard where you can put your favorite charts, maps and reports for fast access. You can search directly from the dashboard for analysis related to a particular subject or for other people. The dashboard features integrated messaging functionality which lets you communicate directly with other users. From the dashboard you can view the data interpretation feed – data interpretations shared from the various analytics modules will appear here so that you can better understand your data and your organization. From the feed you can comment on other people's interpretations and start discussions.


**Interoperable**


DHIS2 comes with great capabilities for system integration and interoperability and features its own format for meta-data and data exchange called DXF 2 as well as the ADX standard. Most parts of the system can be accessed through the extensive REST-based Web API, making interoperability with third-party clients like Android apps, Web portals and other information systems easy. You can even set up scheduled integration jobs in order to periodically synchronize with or import data from other sources.


**Skills Needed**

For running the server: Managing Tomcat, Postgres on Ubuntu.  
For extending the functionality with new web interfaces: React.  
For developing new Android functionality using the DHIS2 SDK: Java

**Training Available**

There is free online training at: <https://www.dhis2.org/covid-training-material> 

**Software Download** <https://www.dhis2.org/covid-19>   
<https://www.dhis2.org/downloads>

**Access to development code** <https://github.com/dhis2> 


**Multilingual** DHIS2 supports localization into any language (including support for non-Roman characters). A robust community-supported translation platform allows the community to contribute translations for any language. The user interface is currently translated into 20+ languages. In addition, DHIS2 lets you translate your database content into as many languages as you like. Each user can easily switch between languages on the fly based on user account settings. If you need to translate the user interface into a new language that's easy, too.


The DHIS2 Digital Metadata packages for COVID-19 are currently available in English, French, Spanish, Portuguese, Russian, and Arabic. More languages can be added through the translation platform.




**User guides** <https://community.dhis2.org/c/implementation/covid-19/41> 

**HQ ITF Support** Limited; HQ supports an online Community of Practice ([community.dhis2.org](https://community.dhis2.org)) and can coordinate assistance through regional implementation partners.

**In country support** Implementing partners and HISP partners. HISP partners in 13 countries across Africa, Latin America, Asia and Europe provide country support; in some cases, DHIS2 experts from HISP are seconded to MOH.

**Other support** Health Information Systems Programme (HISP) partners in Vietnam, Bangladesh, India, Tanzania, Uganda, Nigeria, Sri Lanka, Rwanda, Mozambique, South Africa, Colombia, <https://www.mn.uio.no/ifi/english/research/networks/hisp/> 

**Country uses** DHIS2 is used in over 70 countries. The DHIS2 COVID-19 Package is currently deployed in 28 countries in operation with 22 in development. See [www.dhis2.org/in-action](https://www.dhis2.org/in-action) 

**Other resources** COVID-19 Digital Data Packages: [dhis2.org/covid-19](https://www.dhis2.org/covid-19)   
DHIS2 Community of Practice: [community.dhis2.org](https://community.dhis2.org)   
Documentation: <https://docs.dhis2.org/> 

# Surveillance, Outbreak Response Management and Analysis System (SORMAS®)

The Surveillance, Outbreak Response Management and Analysis System (SORMAS®) is an open-source, mobile eHealth system that organizes and facilitates disease control and outbreak management, in addition to disease surveillance and epidemiological analysis, for all administrative levels of the public health system.

Software	SORMAS
<b>System Overview</b>	<p>The Surveillance, Outbreak Response Management and Analysis System (SORMAS®) is an open-source, mobile eHealth system that organizes and facilitates disease control and outbreak management, in addition to disease surveillance and epidemiological analysis, for all administrative levels of the public health system.</p> <p>It aims to improve prevention and control of communicable diseases, particularly in resource-poor settings, and the system is being designed by those involved in public health surveillance and disease control. SORMAS is free of charge and adheres to the highest data protection standards, good scientific practice and open access policy (GNU GPL v.3 license).</p> <p>The SORMAS-CoV module contains all disease-specific diagnostic standards, case definitions, and containment procedures defined by the World Health Organization. All procedures are embedded in the new module and compatible with those already in the SORMAS software. This includes different user roles within public health services, such as local informants, epidemiologists, laboratory technicians, and point of entry officers.</p> <p>The module allows the targeted collection of relevant epidemiological data about the case person, including hospitalization, symptoms and persons with whom they have come into contact. Furthermore, the task management feature, a strength of SORMAS, facilitates coordinated action of the surveillance personnel in the outbreak response.</p>



**COVID-19  
Specific  
Functions**


Aggregate:

- Standard reporting (case count, contact count, lab confirmation and deaths)
- Daily zero reporting and epi week
- Statistical analysis based on reports (Maps, charts, graphs etc.)
- Import and export (CSV)
- Line listing
- Configuration by disease

Case-based:

- Enroll and track suspected cases
- Contact tracing
- Follow-up visit
- Network transmission chain visualization (R application add-in)
- Laboratory sample management
- Event/rumor tracking (early warning)
- Port of entry reporting
- Vaccination campaigns (on request)
- Patient information system for tracking symptoms – external system “prospective monitoring of acute infections-app” (PIA) that can directly be integrated and accessed through SORMAS (on request)

**Developer**

Helmholtz Centre for Infection Research,  
[https://sormasorg.helmholtz-hzi.de/History\\_SORMAS.html](https://sormasorg.helmholtz-hzi.de/History_SORMAS.html) 

**Turn-key COVID-19 Applications**

Yes

**Link to site**

<https://sormasorg.helmholtz-hzi.de/index.html> 

**Type of Digital Tool**


Surveillance system for aggregate and case-based data recording including contact tracing, event monitoring and samples.

**Interoperability**


SORMAS can pull data from LMIS using an API – Technical Assistance required

**Hosting**

Local, Cloud and Docker (containers)

<b>Cost</b>	Free (GNU GPL v.3). If needed, end-to-end support in customization, hosting and maintenance can be offered for a fee.
<b>Mobile</b>	Yes
<b>Mobile Clients</b>	Vaadin, HTML5, React, SMS
<b>Mobile Platform</b>	SORMAS Mobile App on Android (REST API)
<b>Email</b>	No
<b>SMS</b>	Integrated SMS engine will allow two-way communication between data collection on mobile devices and the server to receive messaging or send it.
<b>Database Type</b>	PostgreSQL/MySQL
<b>Mobile Data Collection</b>	Data collection forms on both mobile and web with sync protocol (manual)
<b>Data Management</b>	Manage aggregate, line listing and case-based data through a flexible meta-data model which is configurable through the user interface. Furthermore, laboratory test, sample management and event data also managed through the user interface. Set up of data elements, data entry forms, validation rules, indicators and reports possible through programmatic configuration.
<b>Development Language</b>	Java
<b>Data Security and Privacy</b>	<a href="https://sormasorg.helmholtz-hzi.de/privacy.html">https://sormasorg.helmholtz-hzi.de/privacy.html</a>  External audit of the software conducted.
<b>Data Standards</b>	REST-based Web API, web user interface in HTML 5 standard, IHR standards, Open HIE, FHIR
<b>Analysis</b>	Standard chart types like column, line, pie, stacked column and area charts. Display of trend lines, legends, titles, labels, target lines and baselines possible.
<b>Charts</b>	Charts can be downloaded and saved SPG, JPEG and PDF.

<b>GIS</b>	Uses OpenStreetMap. Under configuration, shapefiles can be imported under infrastructural data.
<b>Dashboards</b>	Dashboard available to all users based on user level. The dashboard can be filtered and sorted.
<b>Interoperable</b>	REST-based Web API
<b>Skills Needed</b>	MySQL, Java, PostgreSQL, HTML5
<b>Training Available</b>	<a href="https://github.com/hzi-braunschweig/SORMAS-Project/files/2585973/SORMAS_Technical_Manual_Webversion_20180911.pdf">https://github.com/hzi-braunschweig/SORMAS-Project/files/2585973/SORMAS_Technical_Manual_Webversion_20180911.pdf</a>   (EN)
<b>Software Download</b>	<a href="https://github.com/hzi-braunschweig/SORMAS-Project/releases/">https://github.com/hzi-braunschweig/SORMAS-Project/releases/</a> 
<b>Access to development code</b>	<a href="https://github.com/hzi-braunschweig/SORMAS-Project">https://github.com/hzi-braunschweig/SORMAS-Project</a> 
<b>Multilingual</b>	User interface support for 10 languages. Each user can easily switch between languages on the fly. New language translation requests and additions done through crowd-sourced platform, CrowdIn.
<b>User guides</b>	<a href="https://github.com/hzi-braunschweig/SORMAS-Project/files/2585973/SORMAS_Technical_Manual_Webversion_20180911.pdf">https://github.com/hzi-braunschweig/SORMAS-Project/files/2585973/SORMAS_Technical_Manual_Webversion_20180911.pdf</a>  
<b>HQ ITF Support</b>	None
<b>In country support</b>	Implementing partners (GCNet in Ghana) and government data team (Nigeria has a data team in the NCDC managing deployments)
<b>Other support</b>	Helmholtz Centre for Infection Research (HZI), Vitagroup AG, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
<b>Country uses</b>	Fiji, France, Germany, Ghana, Nigeria, Switzerland (active)

**Other resources** Twitter: <https://twitter.com/SormasD> (DE)  
Twitter: [https://twitter.com/Sormas\\_open](https://twitter.com/Sormas_open) (EN)  
Helmholtz Centre for Infection Research (HZI) SORMAS  
resources: <https://www.helmholtz-hzi.de/de/forschung/forschungsprojekte/ansicht/projekt/detail/sormasr-open/> 

## Go.Data

Go.Data is an outbreak investigation tool for field data collection during public health emergencies. The tool includes functionality for case investigation, contact follow-up, visualization of chains of transmission including secure data exchange on demographics, epidemiology, lab data, hospitalization/isolation events, and clinical outcomes. It is designed for flexibility in the field, to adapt to the wide range of outbreak scenarios. The tool is targeted at any outbreak responder, but primarily for contact tracers, contact tracer supervisors and field epidemiologists.

Software	Go.Data
<b>System Overview</b>	<p>Go.Data is an outbreak investigation tool for field data collection during public health emergencies. The tool includes functionality for case investigation, contact follow-up, visualization of chains of transmission including secure data exchange on demographics, epidemiology, lab data, hospitalization/isolation events, and clinical outcomes. It is designed for flexibility in the field, to adapt to the wide range of outbreak scenarios. The tool is targeted at any outbreak responder, but primarily for contact tracers, contact tracer supervisors and field epidemiologists.</p> <p>Go.Data has standard metadata packages for several diseases that align with WHO Surveillance Protocols around IDSR and field epi data collection, including COVID-19, Ebola and MERS. The platform is highly configurable, including flexible questionnaire builders and language tokens for translation. The platform is currently available in 6 languages. The Go.Data platform is free of charge for requesting countries and institutions.</p>

**COVID-19  
Specific  
Functions**

Metadata packages have been developed for that align with the most up-to-date WHO Surveillance Guidance, including standardization with all core metadata collected as part of WHO Case Reporting Forms reported to COVID-MART / X-MART on daily and weekly basis since the start of the outbreak. This facilitates for streamlined IDSR reporting for countries if desired. Other extended metadata packages exist for countries doing more extensive data collection or research investigations, such as the COVID First Few Hundred Cases (FFX) Protocol (Regular + Household Transmission Protocol) and the Unity Studies for HealthCare Workers. These metadata packages include all necessary data elements and forms to be activated out-of-the-box with flexibility to add additional components where needed. Components of COVID-19 functions in Go.Data include (offline and online for all, via app or web app): Case Line lists; Case Investigation Protocol Module; Contact Line lists; Contact Follow Up Modules; Event & Exposure Registration & Tracking of Relationship; viewing dynamically chains of transmission; and delegating daily contact tracing activities to field staff via generation of follow-up lists according to follow-up schedules and status of contacts.

**Developer**

WHO in collaboration with partners in the Global Outbreak Alert and Response Network (GOARN).

**Turn-key COVID-19 Applications**

Yes

**Link to site**

<https://www.who.int/godata> 

<https://community-godata.who.int> 

**Type of Digital Tool**

Outbreak investigation tool for case-based data for cases, contacts and exposure events, including a mobile data collection component for daily contact follow up by contract tracers.

**Interoperability** The tool exposes a RESTful Application Programming Interface (API) whose methods are self-documented using the Loopback Explorer API tool. Scripts are developed to transfer case and contacts registered in DHIS2 COVID-19 Tracker Module to Go.Data to visualize chains of transmission. A range of interoperability discussions are under way to facilitate data exchange with digital data collection tools. Data can be imported into or exported from Go.Data in various file formats (.xls, .json) with built in field mapping tools to detect corresponding fields and map metadata. Go.Data has language tokens, which allow for quick translation via export and import into the platform; as well as ability to enforce standards (i.e. HL7 or FHIR) with metadata conventions in this fashion if desired.

**Hosting** Local and server based. Option to host on WHO servers temporarily if server maintenance is not feasible in country at time of installation.

**Cost** Free

**Mobile** Yes

**Mobile Clients** Android, Apple iOS

**Mobile Platform** Download of mobile app is available from Google Play and Apple App store. It allows visualization of data from cases, contacts and follow-ups. User can set auto synchronization or collect offline and synchronize when connected to Internet or WiFi.

**Email** No

**SMS** exploration of RapidPro integration underway

**Database Type** MongoDB

**Mobile Data Collection** Data collection forms on both mobile and web with sync protocol (manual or auto configuration) which allows for disaggregated data collection by contact tracers and contact tracer supervisors on daily contact follow-ups, based on their pre-defined catchment area. Ability to view relationship in another catchment area if it is a source or sink of a contact residing in their area.

## Data Management

The system supports data collection, including case investigation and contact tracing. You can configure Go.Data to create specific user types and permissions for access to the system's data. The system contains "Outbreak Templates" including for COVID-19 and a range of other outbreaks. A new outbreak can be generated based on a template and then edited for more information collection via flexible questionnaire builders, allowing for data capture and storage for cases and events (connected with their associated lab and hospital/isolation data); events; and storage of ongoing relationships created between exposures. Quick actions are available to export contact, case and relationship data. Templated R Markdowns for automatic API retrieval for core data elements for advanced analysis; including generation of operational dashboards for daily and weekly monitoring.

## Development Language

Node.js®


## Data Security and Privacy

- Passwords are encrypted.
- Captcha can be optionally enabled on password-related screens.
- By default, all authentication tokens have a time to live (TTL) of 10 minutes. You can reduce or increase this value by changing the config.json file.
- Only one authentication token per user account can be active at a time (if you sign in, previous tokens associated with that account are disabled).
- All backups can be encrypted by specifying the encryption key in config.json file
- Communication between mobile apps and API can be encrypted as well: Users have the option to exchange encrypted information between the app and the API. This option is present on the hub configuration screen as the "Encrypted connection" switch. By default, the encrypted connection is turned on. This option can later be turned off from the hub configuration screen.
- The MongoDB is not encrypted so should always be placed in a secure location.
- Go.Data does not include its own web server, if you need to install a HTTPS security layer then you should place the tool behind a suitable reverse proxy (or load balancer). See the section later in this document.

## Data Standards

REST-based Web API. All COVID-19 metadata aligned to WHO Surveillance Guidance and protocols, including IDSR reporting by countries. Language tokens allow for bulk data standardization to FHIR, HL7 if desired.

## Analysis

The in-app analytics give a quick snapshot of data in the platform; high-level and aggregate epi trends/KPIs, and chains of transmission. Summary charts (case, cases by geographic location, and hospitalization summary); histogram – size of chains of transmission; Epidemiological curve; contact follow-up report; cases based on contact status; KPIs (cases who have died, currently hospitalized, cases with less than “x” contacts, new cases in previous “x” days among known contacts, cases refusing to be transferred, new cases in previous “x” days in known transmission chains, cases with pending lab results); chains of transmission graphs and maps (bubble network, geospatial map, hierarchical network, timeline network, date of onset, timeline network – date of last contact, bars vs. list). Data can be exported in a range of formats for advanced analytics with native web-app export; or data can be retrieved directly from API or MongoDB via R (scripts of which exist in online Github Repo: <https://github.com/godata-who/godata> ) Templated cleaning scripts and canned R markdown reports to view operational daily / weekly dashboards.

## Charts

(See above) Dashboard elements (charts, KPIs, EPI curve, etc.) cannot be exported as images – user would do a screen capture/snip. Reports can be generated for these items without the visualization. Go.Data allows you to export data visualizations in PDF format so that the pages can be printed and assembled like a jigsaw puzzle in a large hard copy format.

You can export data visualizations at any time by selecting Quick actions > Export X, where X stands for the name of the data visualization. The following data visualizations are available to export: Chains of transmission graphs, Chains of transmission bars, and Case count map. Pre-formulated R Markdown reports to generate operational dashboards to track contact follow-up by contact tracers and supervisors, as well as basic demographic and epidemiologic visualizations



## GIS

Go.Data includes a “Cases Count” map visualization element. Users are required to upload location data for every reporting level (adm1, adm2, adm3, etc.). There is not functionality to upload GIS format data (shapefile, geodatabase). Users are required to use a hierarchical JSON or a specific Excel/csv template – documentation is provided for the template set up. The map element uses the centroid of the reporting area and shows the case count in the point symbol. There is not an option to adjust symbolization or to view additional layers. Users have the functionality to zoom and pan and export the map in .png format. Users also have the ability to connect to a custom base map service for use in that map element (REST service). In the mobile app, which is solely for contact follow up – the app will allow you to connect to a map service. If there is location information entered for a contact, navigation is possible.


## Dashboards

Upon logging in to Go.Data, the first feature displayed is the Dashboard. The Dashboard provides a summary of all data recorded in the application for the active outbreak.


To help users understand the overall impact of the active outbreak, the Dashboard displays gauges, charts, an epidemiological curve, and key performance indicators (KPIs).

By interacting with the content displayed by the dashboard, you can view individual features and records within the application, view individual record counts, and edit the KPIs displayed. You can also use filters to further customize the data displayed by the dashboard.

## Interoperable

There is an initiative underway for interoperability of Go.Data and DHIS2, of which org units, cases and contact data can already be transferred via an API wrapper from COVID-19 Tracker Module to Go.Data: <https://github.com/WISCENTD-UPC/godata-api-wrapper/tree/develop> . Additional discussions underway for interoperability with other tools. There is access to a suite of RESTful API endpoints. Go.Data exposes an Application Programming Interface (API) which is used for all interactions between the web front-end, the smartphone applications and even between copies of Go.Data, if you configure multiple instances of the solution to exchange data in an “upstream sever/client application” model.



**Skills Needed** Experience in deploying and maintaining nodeJS/mongoDB solutions on Windows/Linux with experience configuring network, firewall settings and setting up load balanced environments. Experience of writing code against RESTful API interfaces a plus

**Training Available** <https://openwho.org/courses/godata-en> 

**Software Download** Upon request [godata@who.int](mailto:godata@who.int)

**Access to development code** N/A


**Multilingual** Yes and languages can be added via language tokens – documentation provided. Currently available in 7 languages.

**User guides** <https://Community-godata.who.int>   
<https://github.com/godata-who/godata> 

**HQ ITF Support** Go.Data team in the CDC ITF

**In country support** Users can contact WHO regional focal points for more info.

**Other support** Users can contact the Go.Data team or consult the Community of Practice website where they can find questions/resolutions from other posts or post their own questions. They will also find all of the user guides in this location. WHO has been providing access to a server for institutions who wish to pilot or implement a server based instance but do not have access to a server.

website: <https://Community-godata.who.int>   
Go.Data functional mailbox: [godata@who.int](mailto:godata@who.int)

**Country uses** Implemented in 45 countries (Outside of US)

**Other resources** [community-godata.who.int](https://community-godata.who.int)  
<https://github.com/godata-who/godata> 

# Epi Info

Epi Info™ is a public domain suite of interoperable software tools designed for the global community of public health practitioners and researchers. It provides for easy data entry form and database construction, a customized data entry experience, and data analyses with epidemiologic statistics, maps, and graphs for public health professionals who may lack an information technology background. Epi Info™ is used for outbreak investigations; for developing small to mid-sized disease surveillance systems; as analysis, visualization, and reporting (AVR) components of larger systems; and in the continuing education in the science of epidemiology and public health analytic methods at schools of public health around the world.

Software	Epi Info
<b>System Overview</b>	Epi Info™ is a public domain suite of interoperable software tools designed for the global community of public health practitioners and researchers. It provides for easy data entry form and database construction, a customized data entry experience, and data analyses with epidemiologic statistics, maps, and graphs for public health professionals who may lack an information technology background. Epi Info™ is used for outbreak investigations; for developing small to mid-sized disease surveillance systems; as analysis, visualization, and reporting (AVR) components of larger systems; and in the continuing education in the science of epidemiology and public health analytic methods at schools of public health around the world.
<b>COVID-19 Specific Functions</b>	COVID-19 Case Surveillance Forms have been developed and are available from the Epi Info™ Help Desk, and can be customized to meet local, regional, and country requirements.
<b>Developer</b>	Centers for Disease Control and Prevention (CDC)
<b>Turn-key COVID-19 Applications</b>	No
<b>Link to site</b>	<a href="https://www.cdc.gov/epiinfo/index.html">https://www.cdc.gov/epiinfo/index.html</a>
<b>Type of Digital Tool</b>	Mobile Data Collection Tool
<b>Interoperability</b>	Interoperable interface but would require TA to set up
<b>Hosting</b>	Local, cloud, web, and mobile options

<b>Cost</b>	Free
<b>Mobile</b>	Yes
<b>Mobile Clients</b>	Yes
<b>Mobile Platform</b>	Epi Info™ Mobile Companion for Android is optimized for Android data collection and available for free download on the Google Play store. Epi Info™ iOS app is optimized for the Apple platform for data collection and analysis on iPhones and tablets and available for free download from the iTunes store.
<b>Email</b>	No
<b>SMS</b>	No
<b>Database Type</b>	Local data are stored as MS Access format, and has native seamless integration with a SQL Server database if available, but not required; Web Survey data stored on SQL Server tables; Mobile tools temporarily store data on device SQLite databases until transmitted up to the master database via XML and JSON format.
<b>Mobile Data Collection</b>	Replicates the surveillance system on the device for real-time updates to the system, while Internet connectivity exists, or can be uploaded as a batch through direct wired connection or when Internet connectivity is restored.
<b>Data Management</b>	Epi Info™ comes with several tools for managing data including a Classic Analysis tool for developing scripts for routine analyses and a Visual Dashboard tool for real-time data visualization. Data entry forms can include business logic to validate data as they are entered. Reports, line lists, and data exports to compatible formats are common data management tasks available in the Epi Info tools.
<b>Development Language</b>	Desktop tools developed in C#; Web tools developed in Java; Mobile tools developed with Angular JS and Java.
<b>Data Security and Privacy</b>	Yes
<b>Data Standards</b>	Data standards can be established by the organization utilizing the platform. Epi Info™ enables the creation of form templates using standard vocabularies.

## Analysis

Epi Info Classic Analysis tools manipulates, manages, and analyzes data. It acts as a statistical toolbox providing many ways to transform data and perform statistical analyses, charts and graphs. Data can be selected, sorted, listed, manipulated and exported with a series of commands, functions, and operators. Commands may be saved as a script to be run repeatedly if needed to show changes in data over time. Available statistics include frequencies, means, and more advanced processes such as Kaplan-Meier Survival Analysis and Linear and Logistic Regression. Epi Info Visual Dashboard has intuitive and simple to gadgets minimizing the need for programming code. Data can be selected, sorted, listed, or manipulated using the various gadgets. The statistical analyses available in Visual Dashboard include frequencies, means, and more advanced processes such as Linear and Logistic Regression. Visual Dashboard has graphing functionality to display data as an Epi Curve, Pareto Chart, and several other bar and column charts.

## Charts

Epi Info™ Map tool is versatile and can display geographic data in multiple views from the same dataset. Information displayed as data layers in the form of case cluster maps, choropleth maps, dot density maps, or spot maps. Reference layers add geographical boundaries and markers from shapefiles, a map server, or KML (Keyhole Markup Language) files. The use of reference layers allows Epi Map to uniquely identify and designate display settings from both internal and external data sources. Users may modify or filter map data using the data layers. Datasets can filtered or shown over a time series. Users can tailor the map features, legend, and colors to create a customized map and saved or exported for inclusion in reports.

## GIS

Epi Info™ Map tool is versatile and can display geographic data in multiple views from the same dataset. Information displayed as data layers in the form of case cluster maps, choropleth maps, dot density maps, or spot maps. Reference layers add geographical boundaries and markers from shapefiles, a map server, or KML (Keyhole Markup Language) files. The use of reference layers allows Epi Map to uniquely identify and designate display settings from both internal and external data sources. Users may modify or filter map data using the data layers. Datasets can filtered or shown over a time series. Users can tailor the map features, legend, and colors to create a customized map and saved or exported for inclusion in reports.

**Dashboards**

Epi Info Visual Dashboard has intuitive and simple to gadgets minimizing the need for programming code. Data can be selected, sorted, listed, or manipulated using the various gadgets. The statistical analyses available in Visual Dashboard include frequencies, means, and more advanced processes such as Linear and Logistic Regression. Visual Dashboard tool displays data in all the basic chart and graph styles including Epi Curve, Pareto Chart, and several other bar and column charts. Legends and colors can be customized. Gadget canvases can be saved and automatically updated with the latest results when re-opened.

**Interoperable**

Epi Info™ tools can create encrypted data packages for sharing to other Epi Info™ sites. The Analysis and Visual Dashboard tools can export data to web and cloud services, MS Access, SQL Server, CSV, and MongoDB for interoperability with systems using those technologies.

**Skills Needed**

Epi Info™ Form design and analysis commands and processes are easy to learn, but a basic understanding of logic and data is helpful.

**Training Available**

The Epi Info™ Team provides onsite and online classes, and self-paced tutorials and training videos are available from our website: <https://www.cdc.gov/epiinfo/support/tutorials.html>; <https://www.youtube.com/playlist?list=PL9B9157E47AB3FDFA>

**Software Download**

<https://www.cdc.gov/epiinfo/support/downloads.html>

**Access to development code**

<https://github.com/Epi-Info/Epi-Info-Community-Edition> 

**Multilingual**

Epi Info™ 7 is downloaded with Spanish and French language modules already implemented, and an additional 8 language modules can be downloaded from our website (). If the language needed is not one of those available, the language translation module enables all text within Epi Info™ (except for commands and other reserved words) to be translated into the language of your choice.

**User guides**

<https://www.cdc.gov/epiinfo/support/userguide.html>

**HQ ITF Support** Epi Info™ Help Desk has a 2 regular staff and can coordinate assistance with other members of the development team who are available to assist with more complex requests.

**In country support** In-country users can connect with each other through the Epi Info™ Questions for Confluence site (<https://epiinfo.atlassian.net/wiki/spaces/CQ/pages/91722299/Epi+Info+Community+Questions+Answers>), and in-person support by the Epi Info™ Development Team is limited but can possibly be arranged for short trips depending on availability.

**Other support** The Epi Info™ Questions for Confluence site (<https://epiinfo.atlassian.net/wiki/spaces/CQ/pages/91722299/Epi+Info+Community+Questions+Answers>) allows the community of users to support each other by reviewing, learning from, and answering each others' posts, sharing form templates, and providing tips and tricks to common tasks. The Epi Info™ Help Desk team also closely monitors the site and often responds to questions that go unanswered by the community.

**Country uses** While the exact number of countries where Epi Info™ is in use changes daily, we know it has been downloaded and used on all continents, including Antarctica, and is currently used world-wide.

**Other resources** <https://www.cdc.gov/epiinfo/support/helpdesk.html>

## Open Data Kit (ODK)

Open Data Kit was started to make mobile data collection tools for resource-limited settings. Over the last 13 years, the project has produced two tool suites (ODK, ODK-X) and has become home to a community of users, implementers and developers. To broaden the community that has grown around the project, we are retiring the use of the “Open Data Kit” brand and forming a new umbrella organization, Data Software for Social Good (DSFSG). DSFSG aims to enable collaboration within the data software for social good ecosystem and welcome a diverse and independent set of member projects.

**Software**

**Open Data Kit (ODK)**

## **System Overview**

Open Data Kit was started to make mobile data collection tools for resource-limited settings. Over the last 13 years, the project has produced two tool suites (ODK, ODK-X) and has become home to a community of users, implementers and developers.

To broaden the community that has grown around the project, we are retiring the use of the “Open Data Kit” brand and forming a new umbrella organization, Data Software for Social Good (DSFSG). DSFSG aims to enable collaboration within the data software for social good ecosystem and welcome a diverse and independent set of member projects.

ODK lets you build powerful offline forms to collect the data you need, wherever it is.

From disease surveillance to household surveys, ODK is the standard for offline data collection.

ODK is open-source software. Install it yourself or use ODK Cloud and ODK Services to go faster

With ODK, you can:

1. Build a form to collect text and numbers, but also get GPS traces, scan barcodes, play videos or more
2. Collect data offline with the mobile app or the web app. Forms and submissions are synced when a connection is found.
3. Download your data in a variety of formats or connect apps like PowerBI or R to create shareable dashboards.



**COVID-19  
Specific  
Functions**

ODK has been used to fight both endemic and pandemic diseases for more than a decade and it's being used in the COVID-19 response for disease surveillance, rapid diagnostics, and vaccine trials. Below are a few selected examples.

Global: The London School of Hygiene & Tropical Medicine is running offline vaccine trials in low and middle-income countries with ODK.

Honduras: 85,000 teachers use ODK to report on remote teaching and the educational progress of 1.8 million students.

Nigeria: 70,000 enumerators will be mapping 2 million farms with ODK in order to keep local food supply chains thriving during the pandemic.

Somalia: Contact tracing data from 4,000 health workers trained by the WHO flows through ODK.

South Sudan: WHO and the Ministry of Health rely on ODK to get real-time data on contacts.

Niger: WHO's surveillance for COVID-19 cases is powered by ODK.

Kenya: CORE Group's community health volunteers capture potential human and animal cases on ODK.

Philippines: Quarantined and hospitalized cases in Region 12 are reported using ODK.

Zimbabwe: Surveillance teams use ODK for contact tracing.

Burundi: Health workers use ODK to assess surveillance capacity.

Rwanda: Infections are being traced through ODK for analysis by outbreak investigation teams.

**Developer**

Get ODK

**Turn-key COVID-19 Applications**

Yes








**Link to site**



<https://www.getodk.org/> 


**Type of Digital Tool**

Mobile Data Collection Tool

<b>Interoperability</b>	API available for connecting to other systems. See <a href="https://docs.getodk.org/central-api">https://docs.getodk.org/central-api</a> for more.
<b>Hosting</b>	Local and cloud options
<b>Cost</b>	Free
<b>Mobile</b>	Yes
<b>Mobile Clients</b>	Android, iOS (web forms only)
<b>Mobile Platform</b>	ODK Collect, the mobile client, is available on the Google Play Store. iOS users can use the built in web browser.
<b>Email</b>	No
<b>SMS</b>	ODK Collect, the mobile client, can send customized SMSes as part of form filling process.
<b>Database Type</b>	PostgreSQL
<b>Mobile Data Collection</b>	ODK forms are designed with Excel (aka XLSForm), deployed on Android devices running ODK Collect or any web browser on iOS/Mac/Windows for data collection. The resulting submissions are stored on the ODK Central server.
<b>Data Management</b>	Data is stored in ODK Central server. Data management is done through the forms users design and the actions they take on the server (e.g., export).
<b>Development Language</b>	ODK Collect, the mobile app, is written in Java. ODK Central, the server, is JavaScript.
<b>Data Security and Privacy</b>	<a href="https://docs.getodk.org/security-privacy/">https://docs.getodk.org/security-privacy/</a> <a href="https://docs.getodk.org/encrypted-forms/">https://docs.getodk.org/encrypted-forms/</a>
<b>Data Standards</b>	Supports FHIR and HL7
<b>Analysis</b>	Data can be exported to analytical tools such as PowerBI, Tableau, R, and Excel.
<b>Charts</b>	Download data in the CSV format or connect PowerBI, R, and Excel directly to server for live-updating charts.

<b>GIS</b>	Download data in the CSV format or connect PowerBI, R, and Excel directly to server for live-updating maps.
<b>Dashboards</b>	Download data in the CSV format or connect PowerBI, R, and Excel directly to server for live-updating dashboards.
<b>Interoperable</b>	Use OData or JSON feed to integrate with other systems. REST APIs are also available for integration.
<b>Skills Needed</b>	<p>Implementers: Excel to design forms, Linux to set up local server (or no skills if you use ODK's cloud).</p> <p>Developers: Java to extend mobile app, JavaScript to extend server.</p>
<b>Training Available</b>	<a href="https://docs.getodk.org">https://docs.getodk.org</a> 
<b>Software Download</b>	<a href="https://getodk.org/software/">https://getodk.org/software/</a> 
<b>Access to development code</b>	<a href="https://github.com/getodk/collect">https://github.com/getodk/collect</a> 
<b>Multilingual</b>	ODK is multilingual. The mobile app has been translated into 50+ languages. Forms support whatever language the form designer includes. See <a href="https://docs.getodk.org/form-language">https://docs.getodk.org/form-language</a> for more.
<b>User guides</b>	<a href="https://docs.getodk.org/">https://docs.getodk.org/</a>  <a href="https://docs.getodk.org/getting-started/">https://docs.getodk.org/getting-started/</a> 
<b>HQ ITF Support</b>	Limited
<b>In country support</b>	<a href="https://forum.getodk.org/">https://forum.getodk.org/</a> 
<b>Other support</b>	<a href="https://forum.getodk.org/">https://forum.getodk.org/</a> 
<b>Country uses</b>	ODK is in active use in every country in the world, with projects regularly collecting millions of submissions.

**Other resources** <http://www.nixdell.com/classes/Tech-for-the-underserved/Hartung.pdf>  

<https://applications.digitalsquare.io/notice-c/concept-note/62>  


## CommCare

CommCare is an open source, offline first, digital health platform that allows users to easily build and deploy custom data collection and decision support applications. The software, developed by Dimagi, enables anyone to build web and mobile apps in a “no-code” environment. These apps can be designed for anything from simple surveys to comprehensive longitudinal data tracking and case management with decision support, multimedia, and SMS messaging.

Software	CommCare
<b>System Overview</b>	<p>CommCare is an open source, offline first, digital health platform that allows users to easily build and deploy custom data collection and decision support applications. The software, developed by Dimagi, enables anyone to build web and mobile apps in a “no-code” environment. These apps can be designed for anything from simple surveys to comprehensive longitudinal data tracking and case management with decision support, multimedia, and SMS messaging.</p> <p>CommCare is the most widely adopted digital health platform in the world. As of August 2020, CommCare has been used in 130 countries and supports nearly 700,000 active frontline health workers in a variety of settings, from the community level, to facility, district, and country-wide.</p>

**COVID-19  
Specific  
Functions**

To support organizations and governments with their ongoing COVID-19 response efforts, Dimagi developed a series of pre-built COVID-19 template applications. They are available to be used as fully-functioning applications on desktop or mobile browsers and as standalone, offline-capable, Android applications to carry out disease surveillance and educational activities based on protocol from WHO, CDC, and other leading public health organizations. Dimagi's template applications include:

- **Contact Tracing: WHO First Few X (FFX) Cases Protocol** – This template application reflects the WHO's protocols to investigate the First Few X (FFX) cases and their close contacts. Available in English, French, Spanish, Hindi, and Portuguese.
- **Port of Entry Surveillance:** This application reflects WHO protocols to detect and report on ill travelers and their contacts at points of entry. Used as an intake and surveillance tool at points of entry (airports, seaports, border crossings, etc.). Available in English, French, Spanish, Hindi, and Portuguese
- **Facility Readiness and Stock Tracking:** Based on WHO protocol, this application enables facility readiness planning and allows for the recording and reporting of specific COVID-19 related resources; it is available in English, French, Spanish, Hindi, and Portuguese.
- **Health Care Provider Training & Monitoring:** This application is designed for Health Care Providers (HCPs) with daily symptom screening, self-risk assessments, educational materials & best practices, and a form to submit suggestions for improved facility response to COVID-19. Available in English, French, Spanish, Hindi, and Portuguese.
- **Sample Tracking and Lab Testing:** This application helps manage COVID-19 testing, used by health workers to collect samples and to receive and triage test results. Available in English.

**Developer**

Dimagi, <https://www.dimagi.com/> 

**Turn-key COVID-19 Applications**


Yes

**Link to site**

<https://www.dimagi.com/covid-19/> 

**Type of Digital Tool**

Mobile data collection and case management system

**Interoperability** CommCare has robust APIs and flexible data import/export functionality that enable interoperability with other platforms. Resources on CommCare's APIs are detailed here: <https://confluence.dimagi.com/display/commcarepublic/CommCare+HQ+APIs> 

The platform also has out-of-the-box integrations with Excel, Tableau, and PowerBI.

**Hosting** Local and Cloud based options available

**Cost** Free for COVID

**Mobile** Yes

**Mobile Clients** Android

**Mobile Platform** CommCare is available on the Google Play Store <https://confluence.dimagi.com/display/commcarepublic/Install+CommCare+for+Android+Smartphones>

**Email** Yes, daily reports and end-user messaging can be sent via email

**SMS** Robust support for both scheduled and live 2-way SMS, including data collection over SMS. CommCare also integrates with other SMS engines.

**Database Type** PostgreSQL

**Mobile Data Collection** The CommCare platform allows you to design simple or complex mobile data collection applications that work on or offline. CommCare applications can collect survey and longitudinal data. When a user is collecting data offline it is stored locally and synchronized whenever there is internet access.


There are several COVID-19 data collection templates already developed and available for immediate use on mobile phones.

**Data Management** Data you collect can easily be viewed in CommCare reports—including line and summary tables, charts, and maps. Data can also be inspected and cleaned within CommCare, as well as exported to CSV and Excel formats. The platform also has out-of-the-box integrations with third party reporting tools like PowerBI and Tableau via an OData connector.

**Development Language**

Python and Java

**Data Security and Privacy**

<https://confluence.dimagi.com/display/commcarepublic/CommCare+Technical+Overview>  


**Data Standards**

CommCare is extremely flexible and thus data standards can be established by the organization using the platform. CommCare allows users to define data elements as they choose.

**Analysis**

Data can be exported to analytical tools such as Tableau, PowerBI, and Excel for analysis. CommCare also provides basic reports (tables, charts, and maps) based on the data you collect, but real-time analytics are not provided by the system.

**Charts**

Within CommCare basic summary, line list, and map based reports can be created but one must export data to a third party tool in order to create more complex visualizations.

**GIS**

CommCare applications can collect GPS coordinates which can be visualized on a map using CommCare's reporting features.

**Dashboards**

CommCare comes with built-in workforce monitoring dashboards so users have insight into which mobile workers are submitting forms, when, and which forms they are submitting.

Data must be exported to a third party reporting tool in order to develop complex dashboards.


**Interoperable**

Integrates with Excel dashboards, DHIS2, OpenMRS, SQL databases, Tableau, Power BI, Zapier integrations, APIs, and webhooks.

**Skills Needed**

No software engineering or coding experience is needed to develop and deploy a CommCare application.

**Training Available**

Dimagi has developed a series of free courses called Dimagi Academy to teach those who are interested how to use CommCare: <https://academy.dimagi.com>  No software engineering or coding experience is needed to develop and deploy a CommCare application.

**Software  
Download**

Google play store


**Access to  
development  
code**

<https://github.com/dimagi/commcare-hq> 

**Multilingual**

As CommCare has been deployed in over 130 countries, most languages are supported. Languages supported include French, English, Spanish, German, Arabic, Bahasa (Indonesia), Chinese, Japanese, Norwegian, Swahili, Bambara, Kinyarwanda (Rwanda), Burmese, as well as several Indian languages and dialects (e.g. Kannada, Hindi, Marathi, Tamil, Telugu, Malayalam, Gujarati, Punjabi, Bengali, and Assamese).

**User guides**

<https://confluence.dimagi.com/display/commcarepublic/Home> 

**HQ ITF Support**

None

**In country  
support**

Dimagi has offices and support staff in South Africa, India, and the USA along with staff members based in Senegal.

**Other support**

<https://confluence.dimagi.com/display/commcarepublic/Dimagi+Support+and+Service+Level+Agreement+%28SLA%29+FAQ>

**Country uses**

CommCare is live in 130 countries around the world. It has been deployed for COVID-19 support in over 30 countries.

**Other resources**

<https://www.dimagi.com/case-studies/> 

<https://www.dimagi.com/covid-19/> 

## KoboToolbox


KoBoToolbox is a suite of tools for field data collection for use in challenging environments. All software is published open source and is completely free to use (no paid tiers). KoBoToolbox is the most widely used data collection toolkit in humanitarian response and is used by many organizations for global health projects and infectious disease response.

**Software**

**KoboToolbox**



**System Overview** KoBoToolbox is a suite of tools for field data collection for use in challenging environments. All software is published open source and is completely free to use (no paid tiers). KoBoToolbox is the most widely used data collection toolkit in humanitarian response and is used by many organizations for global health projects and infectious disease response. It is based on the powerful XForm/XLSForm/ODK standard, includes an intuitive user interface to build forms and analyze collected data, and has two methods of entering data (an Android app and online/offline browser-based data entry for all operating systems). KoboToolbox enable user to save individual question and entire form template to a question library to share with other users.

**COVID-19 Specific Functions** There aren't pre-made COVID-19 templates but there is a request website to request COVID-19 support, <https://ee.kobotoolbox.org/single/VNLm4eav> 

**Developer** Harvard Humanitarian Initiative, <https://hhi.harvard.edu/> 

**Turn-key COVID-19 Applications** No

**Link to site** <https://www.kobotoolbox.org/> 

**Type of Digital Tool** Mobile Data Collection Tool and Analysis

**Interoperability** A lab form can be created with manual entry

**Hosting** Local and Cloud options

**Cost** Free

**Mobile** Yes

**Mobile Clients** KoBo Collect or ODK Collect can run on any Android Device. Web forms can run on any operating system, mobile or desktop (incl. Apple iOS, Windows, etc.) for collecting data online or offline in a browser.


**Mobile Platform** Kobo Collect is available on the Google Play Store; web forms don't require an application but can be bookmarked on any mobile device home screen.

<b>Email</b>	Yes
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<b>SMS</b>	Yes, with additional tool integration.
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<b>Database Type</b>	PostgreSQL
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<b>Mobile Data Collection</b>	Forms are created in KoboToolbox and deployed on devices using KoBo Collect or with a web browser (web forms, see above).
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<b>Data Management</b>	Data is stored in PostgreSQL and there is a community topic for data management, <a href="https://community.kobotoolbox.org/c/kobo-users/data-management/23">https://community.kobotoolbox.org/c/kobo-users/data-management/23</a> 
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<b>Development Language</b>	HTML5, Python
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<b>Data Security and Privacy</b>	<a href="https://www.humanitarianresponse.info/en/applications/kobotoolbox/privacy-policy">https://www.humanitarianresponse.info/en/applications/kobotoolbox/privacy-policy</a> 
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<b>Data Standards</b>	Data standards can be established by the organization utilizing the platform.
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<b>Analysis</b>	<p>Summary reports can be created (with graphs and tables) and disaggregated by other responses. Reports can hide irrelevant questions. Interactive maps can show individual locations of responses based on GPS data and can be disaggregated by other responses. Mapping data can include points, polygons, and areas. Maps can be modified with custom layers that users can upload and store on the server. Data can be exported to other statistical software (XLS, CSV) and accessed via the API for integration in other tools (e.g. PowerBI). Data can also be pushed through a REST service to other applications upon reception by the KoBoToolbox server.</p> <p><a href="https://support.kobotoolbox.org/creating_custom_reports.html">https://support.kobotoolbox.org/creating_custom_reports.html</a> </p> <p><a href="https://support.kobotoolbox.org/converting_to_spss_and_stata.html">https://support.kobotoolbox.org/converting_to_spss_and_stata.html</a> </p> <p><a href="https://support.kobotoolbox.org/excel_analyzer_guide.html">https://support.kobotoolbox.org/excel_analyzer_guide.html</a> </p> <p><a href="https://support.kobotoolbox.org/converting_to_spss_and_stata.html">https://support.kobotoolbox.org/converting_to_spss_and_stata.html</a> </p> <p><a href="https://support.kobotoolbox.org/excel_analyzer_guide.html">https://support.kobotoolbox.org/excel_analyzer_guide.html</a> </p>
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**Charts** Create summary reports with graphs and tables. More options are available by exporting the data to other tools or by integrating with business analysis software (e.g. PowerBI).


**GIS** KoboToolbox leverages OpenStreetMap for mapping the location of data but additional geospatial analysis will need to be conducted in other GIS software.  
[https://support.kobotoolbox.org/export\\_gps.html#](https://support.kobotoolbox.org/export_gps.html#)   
[https://support.kobotoolbox.org/upload\\_to\\_gis.html](https://support.kobotoolbox.org/upload_to_gis.html) 


**Dashboards** All projects have simple dashboards and automatic data reports can be customized to only show the most relevant questions. Data will need to be exported to other software for advanced dashboards.

**Interoperable** KoBoToolbox has a robust API and the ability to leverage REST services for interoperability. KoBoToolbox has two APIs for its primary tools, kpi and kc. Originally kc was the only api for deploying forms and retrieving data. Now, kpi is the primary API that should be used. <https://support.kobotoolbox.org/api.html> 

**Skills Needed** No development language skills are needed to deploy collection forms but if customization is needed in KoBoToolbox, then understanding Python would help.

**Training Available** <https://www.humanitarianresponse.info/en/applications/kobotoolbox/step-1-designing-form> 






**Software Download** <https://github.com/kobotoolbox/kobo-install> 

**Access to development code** <https://github.com/kobotoolbox> 

**Multilingual** Users can create KoBoToolbox projects in any language. The user interface supports English, French, Spanish, Arabic, Hindi, Kurdish, and Chinese. Users are able to contribute additional translations through voluntary contributions in a dedicated volunteer interface.







**User guides** <https://support.kobotoolbox.org> 

**HQ ITF Support** None

<b>In country support</b>	<a href="https://community.kobotoolbox.org/">https://community.kobotoolbox.org/</a> 
<b>Other support</b>	<a href="https://community.kobotoolbox.org/">https://community.kobotoolbox.org/</a> 
<b>Country uses</b>	Examples from the field at the bottom of this page, <a href="https://www.kobotoolbox.org/">https://www.kobotoolbox.org/</a> 
<b>Other resources</b>	<p><a href="https://www.infomigrants.net/en/post/8091/app-designed-to-improve-refugee-services-in-jordan">https://www.infomigrants.net/en/post/8091/app-designed-to-improve-refugee-services-in-jordan</a> </p> <p><a href="https://social.shorthand.com/MaishaBoraTZA/ngE04c6yrf/the-wows-and-woes-of-mande-technology">https://social.shorthand.com/MaishaBoraTZA/ngE04c6yrf/the-wows-and-woes-of-mande-technology</a> </p>

## Excel

Excel spreadsheets are convenient when a country lacks other software and when Excel is already used by staff. It allows line lists, formulas, analysis, and charts/graphs.

Software	Excel
<b>System Overview</b>	Excel is convenient when a country lacks other software and when Excel is already used by staff. It allows line lists, formulas, analysis, and charts/graphs.
<b>COVID-19 Specific Functions</b>	<p>Custom functions in Excel have been built by various groups to support COVID such as:</p> <p>COVIDTracer – <a href="https://www.cdc.gov/coronavirus/2019-ncov/php/contact-tracing/COVIDTracer.html">https://www.cdc.gov/coronavirus/2019-ncov/php/contact-tracing/COVIDTracer.html</a>, Modeling – <a href="https://www.medrxiv.org/content/10.1101/2020.03.23.20041590v2">https://www.medrxiv.org/content/10.1101/2020.03.23.20041590v2</a> , AMDA LineList – <a href="https://paltc.org/sites/default/files/COVID-19%20Symptomatic%20Line%20List%20Template%203162020.xlsx">https://paltc.org/sites/default/files/COVID-19%20Symptomatic%20Line%20List%20Template%203162020.xlsx</a>  , WHO health statistics – <a href="https://www.who.int/healthinfo/statistics/data/en/">https://www.who.int/healthinfo/statistics/data/en/</a> , ADNIA – <a href="https://www.youtube.com/watch?v=9G2iqJmAmmk">https://www.youtube.com/watch?v=9G2iqJmAmmk</a>, Harvard – <a href="https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/L20LOT">https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/L20LOT</a> </p>
<b>Developer</b>	Microsoft
<b>Turn-key COVID-19 Applications</b>	No
<b>Link to site</b>	<a href="https://www.microsoft.com/en-us/microsoft-365/excel">https://www.microsoft.com/en-us/microsoft-365/excel</a> 

**Type of Digital Tool** Data collection, database, and analysis

**Interoperability** Some lab systems have integrated the import and export of data directly into excel also Lab test results can be manually entered into a spreadsheet; <https://www.msc-lims.com/demo/excelinterface.html> [https://www.limswiki.org/index.php/LIMS\\_feature](https://www.limswiki.org/index.php/LIMS_feature)

**Hosting** Local and Cloud options

**Cost** Fee based

**Mobile** Yes

**Mobile Clients** Android, Apple iOS

**Mobile Platform** Excel is available on the Google Play Store and the Apple App Store

**Email** Yes with integration with something like Zapier, <https://zapier.com/apps/email/integrations/excel>

**SMS** Yes with integration with something like Zapier, <https://zapier.com/apps/email/integrations/excel>

**Database Type** Flat files

**Mobile Data Collection** COVID-19 data collection templates are already developed for immediate use for mobile devices and can be created.

**Data Management** Data management is conducted in individual spreadsheets

**Development Language** VBA

**Data Security and Privacy** <https://support.microsoft.com/en-us/office/protection-and-security-in-excel-be0b34db-8cb6-44dd-a673-0b3e3475ac2d>

**Data Standards** Data standards can be established by the organization utilizing excel.

**Analysis** Excel supports a wide range of built in analysis functions, as well as, custom. <https://support.microsoft.com/en-us/office/use-the-analysis-toolpak-to-perform-complex-data-analysis-6c67ccf0-f4a9-487c-8dec-bdb5a2cefab6>

**Charts** Excel supports a wide range of charts, <https://support.microsoft.com/en-us/office/video-create-a-chart-4d95c6a5-42d2-4cfc-aede-0ebf01d409a8#:~:text=Select%20the%20data%20for%20which,how%20your%20data%20will%20look.&text=When%20you%20find%20the%20chart%20you%20like%2C%20click%20it%20%3E%20OK.>

**GIS** Simple mapping is available in excel but for more sophisticated geospatial analysis, the spreadsheet can be linked to GIS software, <https://support.microsoft.com/en-us/office/create-a-map-chart-in-excel-f2cfed55-d622-42cd-8ec9-ec8a358b593b>


**Dashboards** Dashboards can be created in Excel or exported to other software. <https://support.microsoft.com/en-ie/office/create-and-share-a-dashboard-with-excel-and-microsoft-groups-ad92a34d-38d0-4fdd-b8b1-58379aae746e>

**Interoperable** Excel can be integrated with a range of other platforms for import and export of data.

**Skills Needed** Excel, VBA, and macro language is useful

**Training Available** <https://support.microsoft.com/en-us/office/excel-for-windows-training-9bc05390-e94c-46af-a5b3-d7c22f6990bb>


**Software Download** <https://www.microsoft.com/en-us/microsoft-365/excel> 

**Access to development code** <https://developer.microsoft.com/en-us/office> 

**Multilingual** <https://support.microsoft.com/en-us/office/add-an-editing-or-authoring-language-or-set-language-preferences-in-office-663d9d94-ca99-4a0d-973e-7c4a6b8a827d#:~:text=such%20as%20Word.,,Select%20File%20%3E%20Options%20%3E%20Language.,the%20list%20of%20editing%20languages.>


**User guides** <https://support.microsoft.com/en-us/office/excel-for-windows-training-9bc05390-e94c-46af-a5b3-d7c22f6990bb>

**HQ ITF Support** Limited

**In country support** There are many implementing partners that support Excel.  
<https://dynamics.microsoft.com/en-us/partners/find-a-partner/>  


**Other support**

**Country uses**

**Other resources** <https://surveillance.cancer.gov/help/joinpoint/tech-help/frequently-asked-questions/using-excel-as-a-data-source>  


<http://welltestsolutions.com/BasicSurv.htm> 

## Paper

The paper process works well when internet coverage, mobile devices, and/or lacking trained staff are not available for data collection.

### Software


### Paper

#### System Overview

The paper process works well when internet coverage, mobile devices, and/or lacking trained staff are not available for data collection. The paper process is typically a paper case investigation form used by the investigation team or at the local health facility. The completed form is then forward to the next level in the health system where it either remains as paper or is entered into another system for data management and analysis.



**COVID-19  
Specific  
Functions**

Many organizations have created forms for COVID that can be downloaded, printed, and used.

<https://www.shrm.org/resourcesandtools/tools-and-samples/hr-forms/pages/health-screening-form-for-visitors.aspx> ,

<https://www.health.state.mn.us/diseases/coronavirus/hcp/covidtestform.pdf>

 <https://www.mhanet.com/mhaimages/COVID-19/ScreeningForm.pdf>  ,

[http://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/\\_documents/covid-19-screening-form.pdf](http://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/_documents/covid-19-screening-form.pdf)  ,

<http://www.hd.ingham.org/Portals/HD/Home/Documents/cd/coronavirus/ICHDWorkHealthScreening.pdf>  

**Developer**

N/A

**Turn-key COVID-19 Applications**

No

**Link to site**

None

**Type of Digital Tool**

Paper data collection

**Interoperability**

Lab data can be entered on the form

**Hosting**

N/A

**Cost**

Free

**Mobile**

On paper

**Mobile Clients**

N/A

**Mobile Platform**

N/A

**Email**

N/A


**SMS**

N/A

**Database Type**

An application will need to be used to enter the data from the paper forms



<b>Mobile Data Collection</b>	Paper forms are custom created
<b>Data Management</b>	Data will need to be entered into an application for data management.
<b>Development Language</b>	Freeform
<b>Data Security and Privacy</b>	Paper forms will need to be protected and stored appropriately to protect the information on the forms.
<b>Data Standards</b>	Data standards can be established by the organization when creating the form
<b>Analysis</b>	Data will need to be entered into an application for analysis
<b>Charts</b>	Data will need to be entered into an application for charts.
<b>GIS</b>	Data will need to be entered into an application for GIS
<b>Dashboards</b>	Data will need to be entered into an application for dashboards
<b>Interoperable</b>	N/A
<b>Skills Needed</b>	Paper data entry form creation, skip patterns, and data flow
<b>Training Available</b>	There are a number of partners who can support paper survey data collection. <a href="https://www.equitytool.org/preparing-the-data-collection-team/">https://www.equitytool.org/preparing-the-data-collection-team/</a> 
<b>Software Download</b>	N/A
<b>Access to development code</b>	N/A
<b>Multilingual</b>	Paper forms can be created in all languages
<b>User guides</b>	<a href="https://www.who.int/csr/resources/publications/surveillance/WHO_CDS_EPR_LYO_2006_2.pdf">https://www.who.int/csr/resources/publications/surveillance/WHO_CDS_EPR_LYO_2006_2.pdf</a>

**HQ ITF Support** Limited

**In country support** CDC country staff and partners

**Other support** [https://www.who.int/csr/resources/publications/surveillance/WHO\\_CDS\\_EPR\\_LYO\\_2006\\_2.pdf](https://www.who.int/csr/resources/publications/surveillance/WHO_CDS_EPR_LYO_2006_2.pdf)

**Country uses** It is not uncommon for paper data collection to occur at the health facility level in countries with limited electronic resources. Often times, health facilities maintain a paper ledger book where the individual case data is captured. This data is then summarized on paper by week, month, or quarterly depending on the program. That paper is then sent to the next level in the health system where it is combined with other data from across that jurisdiction and then entered into the national surveillance system.

**Other resources** N/A

Last Updated Oct. 23, 2020

Content source: [National Center for Immunization and Respiratory Diseases \(NCIRD\), Division of Viral Diseases](#)